

**Claims:**

1. A method for forming a porous dielectric film, comprising:  
forming a silicon based film having a water soluble compound dispersed therein; and  
removing at least a portion of the water soluble compound, thereby providing the porous dielectric film.
2. The method of claim 1, wherein the water soluble compound is selected from at least one member of the group consisting of germanium oxide ( $\text{GeO}_2$ ) and boron oxide ( $\text{B}_2\text{O}_3$ ).
3. The method of claim 2, wherein the water soluble compound is germanium oxide.
4. The method of claim 2, wherein the water soluble compound is boron oxide.
5. The method of claim 1, wherein the forming the silicon based film is by chemical vapor deposition (CVD).
6. The method of claim 1, wherein the forming the silicon based film is by spin on glass (S.O.G.).
7. The method of claim 1, wherein the silicon based film is a carbon doped silicon based film.
8. The method of claim 1, wherein the removing the at least a portion of the water soluble compound is by wet etching the silicon based film.
9. The method of claim 1, further comprising treating the porous dielectric film with an electron beam.

10. The method of claim 1, wherein the dielectric constant of the porous dielectric film is less than 2.0.
11. The method of claim 1, wherein the porosity of the porous dielectric film is at least forty percent.
12. A method for forming a porous dielectric film, comprising:  
doping of nano phase compounds in a silicon based film using chemical vapor deposition (CVD) precursors selected from at least one member of the group consisting of organogermanium compounds, organoboron compounds, germanic acid ( $\text{GeOH}_4$ ) and boric acid ( $\text{H}_3\text{BO}_3$ ); and  
removing at least a portion of the nano phase compounds dispersed in the silicon based film, thereby providing the porous dielectric film.
13. The method of claim 12, wherein the silicon based film is a carbon doped silicon based film.
14. The method of claim 12, wherein the nano phase compounds are soluble in water.
15. The method of claim 12, wherein the nano phase compounds are selected from at least one member of the group consisting of germanium oxide ( $\text{GeO}_2$ ) and boron oxide ( $\text{B}_2\text{O}_3$ ).
16. The method of claim 12, further comprising treating the porous dielectric film with an electron beam.
17. A method for forming a porous dielectric film, comprising:  
doping of controlled size nano phase compounds in a silicon based film using spin on glass (S.O.G.) to spin on the nano phase compounds that are selected from

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at least one member of the group consisting of germanium oxide ( $\text{GeO}_2$ ) and boron oxide ( $\text{B}_2\text{O}_3$ ); and

removing at least a portion of the nano phase compounds dispersed in the silicon based film, thereby providing the porous dielectric film.

18. The method of claim 17, wherein the silicon based film is a carbon doped silicon based film.

19. The method of claim 17, wherein the nano phase compounds are soluble in water.

20. The method of claim 17, further comprising treating the porous dielectric film with an electron beam.